DEPARTMENTS.

SOLUTIONS OF PROBLEMS.

ALGEBRA.

NOTE.—Thomas S. Clarkson remarks that the solution of 321 does not satisfy the conditions of the problem, since the whole number of shares is not to exceed 200. He contends that the problem is impossible as stated, and suggests that it may have been intended that each man's share is not to exceed 200. We think the problem is stated as intended and is therefore impossible. ED. F.

325. Proposed by G. B. M. ZERR, A. M., Ph. D., Philadelphia, Pa.

I have a chronometer whose rate is uniform. When it indicates t_1 time at Washington I find that it is h_1 hours slow. I take it to Philadelphia and when it indicates t_2 time, the local time of Philadelphia is h_2 hours faster. I bring my chronometer back to Washington and find that when it indicates t_3 time it is h_3 hours slow. If $t_1=5$ A. M., $t_2=7$ hours, 54 minutes, $t_3=11$ hours, 46 minutes A. M., $h_1=1$ hour, $h_2=1\ 203/900$ hours, $h_3=1\ 7/30$ hours, find the difference of longitude between Washington and Philadelphia.

Solution by J. EDWARD SANDERS, Weather Bureau, Chicago, Ill, and the PROPOSER.

$(h_3-h_1)/(t_3-t_1)$=error for one hour.

$(t_2-t_1)(h_3-h_1)/(t_3-t_1)$=error at time t_2 in Philadelphia.

$\therefore h_1+t_2+(t_2-t_1)(h_3-h_1)/(t_3-t_1)$=time at Washington.

h_2+t_2=time at Philadelphia.

$h_2+t_2-h_1-t_2-(t_2-t_1)(h_3-h_1)/(t_3-t_1)$=difference of time between the two cities=T.

$$\therefore T=\frac{h_2(t_3-t_1)+h_3(t_1-t_2)+h_1(t_2-t_3)}{t_3-t_1}.$$

$15T=L$=difference in longitude.

$$\therefore L=\frac{15(h_1t_2+h_2t_3+h_3t_1-h_1t_3-h_2t_1-h_3t_2)}{t_3-t_1}.$$

Putting $h_1=1$ hour, $h_2=1\frac{203}{900}$ hours, $h_3=1\frac{7}{30}$ hours, $t_1=5$ hours, $t_2=$ 7 hours 54 minutes, $t_3=11$ hours 46 minutes, we get

$$L=\tfrac{113}{60}^\circ=1^\circ\ 53'.$$

Also solved by T. S. Clarkson.

326. Proposed by R. D. CARMICHAEL, Princeton University.

Is the series, of which the nth term is $\dfrac{1.3.5.7\ldots(2n-1)}{(n+1)!\,2^n.(2n+3)}$ convergent? If so, find its sum.